

# SEQUENCE LISTING

<110> Patten, Phillip  
Stemmer, Willem

<120> METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING

<130> 02-205-0

<140> 08/769,062

<141> 1996-12-18

<150> 08/198,431

<151> 1994-02-17

<150> 08/425,684

<151> 1995-04-18

<150> 08/537,874

<151> 1995-10-30

<160> 98

<170> PatentIn Ver. 2.0

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oligonucleotide used for codon usage library

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50

<210> 2

<211> 38

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oligonucleotide used for codon usage library

<400> 2

aaccctccag ttccgaaccc catatgaaaa aaaccgct

38

<210> 3

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

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oligonucleotide used for codon usage library

<400> 3

aaccctccag ttccgaaccc atatacatat gcgtgctaaa

40

0954692.091301

<210> 4  
 <211> 44  
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 oligonucleotide used for codon usage library

<400> 4  
 aaccctccag ttccgaaccc catatgaaat acctgctgcc gacc 44

<210> 5  
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 oligonucleotide used for codon usage library

<400> 5  
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<210> 6  
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 oligonucleotide used for codon usage library

<400> 6  
 tgggtgttatg tctgctcagg cdatggcdgt dgayttycay ctggttccgg ttgaagagga 60

<210> 7  
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 oligonucleotide used for codon usage library

<400> 7  
 ggctggtttc gctaccgttg cdargcdgc dccdaargay ctggttccgg ttgaagagga 60

<210> 8  
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<220>  
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<400> 8  
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<210> 9

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 102760.2694660

<211> 60  
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 oligonucleotide used for codon usage library

<400> 9  
 gctgctggct gctcagccgg cdatggcdat ggayatyggy ctgggtccgg ttgaagagga 60

<210> 10  
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 oligonucleotide used for codon usage library

<400> 10  
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<210> 11  
 <211> 60  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for codon usage library

<400> 11  
 cccggttttc tggaaccgtc argcdgdcda rgcdctggac gttgctaaaa aactgcagcc 60

<210> 12  
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 <212> DNA  
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<220>  
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 oligonucleotide used for codon usage library

<400> 12  
 acgttatcct gttcctgggt gayggyatgg gygtddcdac cgttaccgct acccgatatcc 60

<210> 13  
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 oligonucleotide used for codon usage library

<400> 13  
 aaactgggtc cggaaccccc dctggcdatg gaycarttyc cgtacgttgc tctgtctaaa 60

<210> 14

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<211> 60  
 <212> DNA  
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<220>  
 <223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for codon usage library

<400> 14  
 ggttcgagac tctgctggta cygcacygc dtayctgtgc ggtgttaaag gtaactaccg 60

<210> 15  
 <211> 60  
 <212> DNA  
 <213> Artificial Sequence

<220>  
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 oligonucleotide used for codon usage library

<400> 15  
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<210> 16  
 <211> 60 -  
 <212> DNA  
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<220>  
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 oligonucleotide used for codon usage library

<400> 16  
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<210> 17  
 <211> 60  
 <212> DNA  
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<220>  
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 oligonucleotide used for codon usage library

<400> 17  
 gtactctgac gctgacctgc cdgdcgaygc dcaratgaac ggttgccagg acatcgctgc 60

<210> 18  
 <211> 60  
 <212> DNA  
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<220>  
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<400> 18  
 acatcgacgt tatcctgggt ggyggycgya artayatgtt cccggttggt accccggacc 60

<210> 19  
 <211> 60

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<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 24

ccgctgacca ctctcacgtt tttcyttyg gyggytayac cctgcgtggg acctctatct 60

<210> 25

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
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<400> 25

gctctggact ctaaattctta yacytcyaty ctgtayggga acggtccggg ttacgctctg 60

<210> 26

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 26

cgttaacgac tctacctctg argayccdtc ytaycarcag caggctgctg ttccgcaggc 60

<210> 27

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 27

aagacgttgc tgttttcgct cgyggyccdc argcdcaayct ggttcacggt gttgaagaag 60

<210> 28

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 28

atggctttcg ctggttgctg dgarccdtay acygaytgga acctgccggc tccgaccacc 60

<210> 29

<211> 61

<212> DNA

<213> Artificial Sequence

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<220>  
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 oligonucleotide used for codon usage library

<400> 29  
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 c 61

<210> 30  
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 <212> DNA  
 <213> Artificial Sequence

<220>  
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 oligonucleotide used for codon usage library

<400> 30  
 ttccgcctct agagaattct tartacagrg thgghgccag gaggagcagc atagcaccag 60  
 cc 62

<210> 31  
 <211> 58  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for codon usage library

<400> 31  
 aagcagccag gtgagcagcg tchggratrg argthgcbgt ggtcggagcc ggcaggtt 58

<210> 32  
 <211> 60  
 <212> DNA  
 <213> Artificial Sequence

<220>  
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 oligonucleotide used for codon usage library

<400> 32  
 cgcaaccagc gaaagccatg atrtghgcha craargtytc ttcttcaaca ccgtgaacca 60

<210> 33  
 <211> 60  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for codon usage library

<400> 33  
 gcgaaaacag caacgtcttc rccrcrtgr gtytcrghg cctgcggaac agcagcctgc 60

<210> 34  
 <211> 60  
 <212> DNA

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<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 34

agaggttagag tcgttaacgt chggrcgrga rccrccccc agagcgtaac ccggaccgtt 60

<210> 35

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 35

aagatttaga gtccagagct ttrgahgghg ccagrcraa gatagaggta ccacgcaggg 60

<210> 36

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 36

acgtgagagt ggtcagcggg haccagratc agrgtrtcca gttcagaggt cagttcgta 60

<210> 37

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 37

gaacatacca gcttcggtca ghgccatrtta hgcyttrtcg tcgtggtgac cgtgggtgat 60

<210> 38

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 38

ggtagaaacc acgcgggtta cgrgahacha crcgcaghgc aacttcggtc atttctgca 60

<210> 39

<211> 60

<212> DNA

<213> Artificial Sequence

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<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 39

tcctgctgaa cgttgtatatt catrtchgch ggytcaaca gacccatcag gtgggtaaca 60

<210> 40

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 40

cagcagagcg gtacggttcc ahacrtaytg hgcrccytgg tgttagcct gccaaagcctg 60

<210> 41

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 41

tacgaacacc gttaacagaa gcrtrtchg grtaytchgg gtccggggta ccaaccggga 60

<210> 42

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 42

cccaggataa cgtcgatgtc catrttrtth accagytghg cagcgatgtc ctggcaaccg 60

<210> 43

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 43

caggtcagcg tcagagtacc arttrcgrtt hacrgtrtga gcgtaagcac cagccggaga 60

<210> 44

<211> 60

<212> DNA

<213> Artificial Sequence

09954692.091201

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 44

tggttaacaac accaacagat ttccchgcgt tythhgrog gttcataaca gaggtaactt 60

<210> 45

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 45

cactggttgt aacgagcagc hgcrghacr ccratrgtrc ggtagttacc tttaacaccg 60

<210> 46

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 46

accagcagag tccggaacct grcgrtchac rttrtargtt ttagacagag caacgtacgg 60

<210> 47

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 47

gggtttccgg acccagttta ccrttcatyt grccyttcag gatacgggta gcggtaacgg 60

<210> 48

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 48

cccaggaaca ggataacggtt ytthgchgr gtytgrathg gctgcagttt tttagcaacg 60

<210> 49

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

09954692.091201

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 49

acggttccag aaagccgggt ctctctcttc aaccggaacc ag

42

<210> 50

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 50

cctgagcaga cataacacca gchgchachg chachgccag cggcagttta cgcaggggtga 60

<210> 51

<211> 62

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 51

accgggggtga acagcagcgg cagcaghgcc aghgcratrg trgactgttt catatgtata 60  
tc 62

<210> 52

<211> 59

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 52

gccggctgag cagccagcag cagcagrcch gchgchgcgg tcggcagcag gtagtttca 59

<210> 53

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 53

aagagatagc gatcggggtg gtcaghacra trccagcag tttagcacgc atatgtatat 60

<210> 54

<211> 58

<212> DNA

<213> Artificial Sequence

<220>

09954692.091204

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 54  
caacggttagc gaaaccagcc aghgchachg crathgorat agcgggtttt ttcatatg 58

<210> 55  
<211> 39  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 55  
agaattctct agaggcggaa actctccaac tcccagggtt 39

<210> 56  
<211> 39  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for codon usage library

<400> 56  
tgagaggttg agggccaat tgggaggtca aggcttggg 39

<210> 57  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 57  
tgtratctgy ctsagacc 18

<210> 58  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 58  
ggcaciaatg vgmagaatct ctc 23

<210> 59  
<211> 22  
<212> DNA  
<213> Artificial Sequence

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<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 59

agagattctk cbcatttggtg cc

22

<210> 60

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 60

cagttccaga agrctsmagc catc

24

<210> 61

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 61

gatggctksa gycttctgga actg

24

<210> 62

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 62

cttcaatctc ttcascaca

19

<210> 63

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 63

tgtgstgaag agattgaag

19

<210> 64

09554692.091201

<211> 18  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for alpha interferon  
 shuffling

<400> 64  
 ggawsagass ctcctaga

18

<210> 65  
 <211> 18  
 <212> DNA  
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<220>

<223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for alpha interferon  
 shuffling

<400> 65  
 tctaggagss\_tctswtcc

18

<210> 66  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for alpha interferon  
 shuffling

<400> 66  
 gaacttdwcc agcaamtgaa t

21

<210> 67  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for alpha interferon  
 shuffling

<400> 67  
 attcakttgc tggwhaagtt c

21

<210> 68  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: degenerate  
 oligonucleotide used for alpha interferon  
 shuffling

09954692.091201

<400> 68  
ggactycatc ctggctgtg

19

<210> 69  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 69  
cacagccagg atgragtcc

19

<210> 70  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 70  
aagaatcact ctttatct

18

<210> 71  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 71  
agataaagag tgattctt

18

<210> 72  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 72  
tgggaggttg tcagagcag

19

<210> 73  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>

0954692-091201

<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 73  
ctgctctgac aacctccca

19

<210> 74  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: degenerate  
oligonucleotide used for alpha interferon  
shuffling

<400> 74  
tcawtccttm ctcyttaa

18

<210> 75  
<211> 166  
<212> PRT  
<213> consensus alpha interferon

<400> 75  
Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
1 5 10 15  
Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
20 25 30  
Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
35 40 45  
Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr  
50 55 60  
Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Ala Trp Glu Gln Ser  
65 70 75 80  
Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu  
85 90 95  
Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met  
100 105 110  
Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
115 120 125  
Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
130 135 140  
Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys  
145 150 155 160  
Arg Leu Arg Arg Lys Asp  
165

<210> 76

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T02T60-2694560



<211> 166  
 <212> PRT  
 <213> human alpha interferon

<400> 76

Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
 1 5 10 15  
 Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
 20 25 30  
 Arg His Asp Phe Gly Leu Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
 35 40 45  
 Gln Lys Thr Gln Ala Ile Pro Val Leu His Glu Met Ile Gln Gln Thr  
 50 55 60  
 Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser  
 65 70 75 80  
 Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asn Leu  
 85 90 95  
 Glu Ala Cys Val Ile Gln Glu Val Gly Met Glu Glu Thr Pro Leu Met  
 100 105 110  
 Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
 115 120 125  
 Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
 130 135 140  
 Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys  
 145 150 155 160  
 Arg Leu Arg Arg Lys Asp  
 165

<210> 77  
 <211> 166  
 <212> PRT  
 <213> human alpha interferon

<400> 77

Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
 1 5 10 15  
 Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
 20 25 30  
 Arg Pro Asp Phe Gly Leu Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
 35 40 45  
 Gln Lys Thr Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr  
 50 55 60  
 Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser  
 65 70 75 80

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Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asn Leu  
85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Met Glu Glu Thr Pro Leu Met  
100 105 110

Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
130 135 140

Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys  
145 150 155 160

Ile Leu Arg Arg Lys Asp  
165

<210> 78  
<211> 166  
<212> PRT  
<213> human alpha interferon

<400> 78  
Cys Asn Leu Ser Gln Thr His Ser Leu Asn Asn Arg Arg Thr Leu Met  
1 5 10 15

Leu Leu Ala Gln Met Arg Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
20 25 30

Arg His Asp Phe Glu Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
35 40 45

Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Met Gln Gln Thr  
50 55 60

Phe Asn Leu Phe Ser Thr Lys Asn Ser Ser Ala Ala Trp Asp Glu Thr  
65 70 75 80

Leu Leu Glu Lys Phe Tyr Ile Glu Leu Phe Gln Gln Met Asn Asp Leu  
85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met  
100 105 110

Asn Glu Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Gln Arg Ile Thr  
115 120 125

Leu Tyr Leu Met Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
130 135 140

Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys  
145 150 155 160

Arg Leu Arg Arg Lys Asp  
165

<210> 79  
<211> 166

009554692-091201

&lt;212&gt; PRT

&lt;213&gt; human alpha interferon

&lt;400&gt; 79

Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
 1 5 10 15

Leu Leu Ala Gln Met Gly Arg Ile Ser His Phe Ser Cys Leu Lys Asp  
 20 25 30

Arg His Asp Phe Gly Phe Pro Glu Glu Glu Phe Asp Gly His Gln Phe  
 35 40 45

Gln Lys Thr Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr  
 50 55 60

Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser  
 65 70 75 80

Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu  
 85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met  
 100 105 110

Asn Val Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
 115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
 130 135 140

Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys  
 145 150 155 160

Arg Leu Arg Arg Lys Asp  
 165

&lt;210&gt; 80

&lt;211&gt; 166

&lt;212&gt; PRT

&lt;213&gt; human alpha interferon

&lt;400&gt; 80

Cys Asp Leu Pro Gln Thr His Ser Leu Gly His Arg Arg Thr Met Met  
 1 5 10 15

Leu Leu Ala Gln Met Arg Arg Ile Ser Leu Phe Ser Cys Leu Lys Asp  
 20 25 30

Arg His Asp Phe Arg Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
 35 40 45

Gln Lys Ala Glu Ala Ile Ser Val Leu His Glu Val Ile Gln Gln Thr  
 50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Val Ala Trp Asp Glu Arg  
 65 70 75 80

Leu Leu Asp Lys Leu Tyr Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu  
 85 90 95

00954652-091201

Glu Ala Cys Val Met Gln Glu Val Trp Val Gly Gly Thr Pro Leu Met  
100 105 110

Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Ser Ser Arg Asn Leu Gln Glu  
145 150 155 160

Arg Leu Arg Arg Lys Glu  
165

<210> 81

<211> 166

<212> PRT

<213> human alpha interferon

<400> 81

Cys Asp Leu Pro Gln Thr His Ser Leu Arg Asn Arg Arg Ala Leu Ile  
1 5 10 15

Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
20 25 30

Arg His Glu Phe Arg Phe Pro Glu Glu Glu Phe Asp Gly His Gln Phe  
35 40 45

Gln Lys Thr Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr  
50 55 60

Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser  
65 70 75 80

Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu  
85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met  
100 105 110

Asn Glu Asp Phe Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
115 120 125

Leu Tyr Leu Met Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Phe Ser Thr Asn Leu Lys Lys  
145 150 155 160

Gly Leu Arg Arg Lys Asp  
165

<210> 82

<211> 166

<212> PRT

<213> human alpha interferon

09954692.091201

&lt;400&gt; 82

Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
 1 5 10 15

Leu Leu Ala Gln Met Arg Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
 20 25 30

Arg His Asp Phe Glu Phe Pro Gln Glu Glu Phe Asp Asp Lys Gln Phe  
 35 40 45

Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr  
 50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Ala Leu Asp Glu Thr  
 65 70 75 80

Leu Leu Asp Glu Phe Tyr Ile Glu Leu Asp Gln Gln Leu Asn Asp Leu  
 85 90 95

Glu Ser Cys Val Met Gln Glu Val Gly Val Ile Glu Ser Pro Leu Met  
 100 105 110

Tyr Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
 115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Ser Cys Ala Trp Glu Val Val  
 130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Ile Asn Leu Gln Lys  
 145 150 155 160

Arg Leu Lys Ser Lys Glu  
 165

&lt;210&gt; 83

&lt;211&gt; 166

&lt;212&gt; PRT

&lt;213&gt; human alpha interferon

&lt;400&gt; 83

Cys Asp Leu Pro Glu Thr His Ser Leu Asp Asn Arg Arg Thr Leu Met  
 1 5 10 15

Leu Leu Ala Gln Met Ser Arg Ile Ser Pro Ser Ser Cys Leu Met Asp  
 20 25 30

Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
 35 40 45

Gln Lys Ala Pro Ala Ile Ser Val Leu His Glu Leu Ile Gln Gln Ile  
 50 55 60

Phe Asn Leu Phe Thr Thr Lys Asp Ser Ser Ala Ala Trp Asp Glu Asp  
 65 70 75 80

Leu Leu Asp Lys Phe Cys Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu  
 85 90 95

0054692.091201  
 102160.2694560

Glu Ala Cys Val Met Gln Glu Glu Arg Val Gly Glu Thr Pro Leu Met  
 100 105 110

Asn Ala Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Arg Arg Ile Thr  
 115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
 130 135 140

Arg Ala Glu Ile Met Arg Ser Leu Ser Leu Ser Thr Asn Leu Gln Glu  
 145 150 155 160

Arg Leu Arg Arg Lys Glu  
 165

<210> 84  
 <211> 166  
 <212> PRT  
 <213> human alpha interferon

<400> 84  
 Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
 1 5 10 15

Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
 20 25 30

Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
 35 40 45

Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr  
 50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Ile Trp Glu Gln Ser  
 65 70 75 80

Leu Leu Glu Lys Phe Ser Thr Glu Leu Asn Gln Gln Leu Asn Asp Met  
 85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met  
 100 105 110

Asn Val Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Gln Arg Ile Thr  
 115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
 130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Lys Ile Phe Gln Glu  
 145 150 155 160

Arg Leu Arg Arg Lys Ser  
 165

<210> 85  
 <211> 166  
 <212> PRT  
 <213> human alpha interferon

09954692"091201

&lt;400&gt; 85

Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
 1 5 10 15

Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp  
 20 25 30

Arg Pro Asp Phe Gly Leu Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe  
 35 40 45

Gln Lys Thr Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr  
 50 55 60

Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser  
 65 70 75 80

Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asn Leu  
 85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Met Glu Glu Thr Pro Leu Met  
 100 105 110

Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
 115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
 130 135 140

Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys  
 145 150 155 160

Ile Leu Arg Arg Lys Asp  
 165

&lt;210&gt; 86

&lt;211&gt; 166

&lt;212&gt; PRT

&lt;213&gt; human alpha interferon

&lt;400&gt; 86

Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile  
 1 5 10 15

Leu Leu Ala Gln Met Gly Arg Ile Ser His Phe Ser Cys Leu Lys Asp  
 20 25 30

Arg Tyr Asp Phe Gly Phe Pro Gln Glu Val Phe Asp Gly Asn Gln Phe  
 35 40 45

Gln Lys Ala Gln Ala Ile Ser Ala Phe His Glu Met Ile Gln Gln Thr  
 50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Ala Trp Asp Glu Thr  
 65 70 75 80

Leu Leu Asp Lys Phe Tyr Ile Glu Leu Phe Gln Gln Leu Asn Asp Leu  
 85 90 95

Glu Ala Cys Val Thr Gln Glu Val Gly Val Glu Glu Ile Ala Leu Met  
 100 105 110

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Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr  
 115 120 125

Leu Tyr Leu Met Gly Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val  
 130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Phe Ser Thr Asn Leu Gln Lys  
 145 150 155 160

Gly Leu Arg Arg Lys Asp  
 165

<210> 87

<211> 501

<212> DNA

<213> consensus alpha interferon

<400> 87

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gaggagtttg	atggcaacca	gttccagaag	gctcaagcca	tctctgtcct	ccatgagatg	180
atccagcaga	ccttcaatct	cttcagcaca	aaggactcat	ctgctgcttg	ggatgagagc	240
ctcctagaaa	aattttccac	tgaactttac	cagcaactga	atgacctgga	agcctgtgtg	300
atacaggagg	ttggggtgga	agagactccc	ctgatgaatg	aggactccat	cctggctgtg	360
aggaaatact	tccaaagaat	cactctttat	ctgacagaga	agaaatacac	cccttgtgcc	420
tgggaggttg	tcagagcaga	aatcatgaga	tccttctctt	tttcaacaaa	cttgcaaaaa	480
agattaagga	ggaaggattg	a				501

<210> 88

<211> 501

<212> DNA

<213> human alpha interferon

<400> 88

tgtgatctgc	ctcagaccca	cagcctgggt	aataggaggg	ccttgatact	cctggcacaa	60
atgggaagaa	tctctccttt	ctcctgcctg	aaggacagac	atgacttttg	acttccccag	120
gaggagtttg	atggcaacca	gttccagaag	actcaagcca	tccctgtcct	ccatgagatg	180
atccagcaga	ccttcaatct	cttcagcaca	gaggactcat	ctgctgcttg	ggaacagagc	240
ctcctagaaa	aattttccac	tgaactttac	cagcaactga	ataacctgga	agcatgtgtg	300
atagaggagg	ttgggatgga	agagactccc	ctgatgaatg	aggactccat	cctggctgtg	360
aggaaatact	tccaaagaat	cactctttat	ctaacagaga	agaaatacac	cccttgtgcc	420
tgggaggttg	tcagagcaga	aatcatgaga	tccttctctt	tttcaacaaa	cttgcaaaaa	480
agattaagga	ggaaggattg	a				501

<210> 89

<211> 501

<212> DNA

<213> human alpha interferon

<400> 89

tgtgatctgc	ctcagaccca	cagcctgggt	aataggaggg	ccttgatact	cctggcacaa	60
atgggaagaa	tctctccttt	ctcctgcctg	aaggacagac	ctgacttttg	acttccccag	120
gaggagtttg	atggcaacca	gttccagaag	actcaagcca	tctctgtcct	ccatgagatg	180
atccagcaga	ccttcaatct	cttcagcaca	gaggactcat	ctgctgcttg	ggaacagagc	240
ctcctagaaa	aattttccac	tgaactttac	cagcaactga	ataacctgga	agcatgtgtg	300
atacaggagg	ttgggatgga	agagactccc	ctgatgaatg	aggactccat	cctggctgtg	360
aggaaatact	tccaaagaat	cactctttat	ctaacagaga	agaaatacac	cccttgtgcc	420
tgggaggttg	tcagagcaga	aatcatgaga	tctctctctt	tttcaacaaa	cttgcaaaaa	480
atattaagga	ggaaggattg	a				501

09954692.091201



<210> 90  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 90  
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 gaggaatttg atggcaacca gttccagaaa gctcaagcca tctctgtcct ccatgagatg 180  
 atgcagcaga ccttcaatct ctccagcaca aagaactcat ctgctgcttg ggatgagacc 240  
 ctctagaaa aattctacat tgaacttttc cagcaaatga atgacctgga agcctgtgtg 300  
 atacaggagg ttgggggtgga agagactccc ctgatgaatg aggactccat cctggctgtg 360  
 aagaaatact tccaaagaat cactctttat ctgatggaga agaaatacag cccttgtgcc 420  
 tgggaggttg tcagagcaga aatcatgaga tccctctctt tttcaacaaa cttgcaaaaa 480  
 agattaagga ggaaggattg a 501

<210> 91  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 91  
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 gaggagtttg atggccacca gttccagaag actcaagcca tctctgtcct ccatgagatg 180  
 atccagcaga ccttcaatct ctccagcaca gaggactcat ctgctgcttg ggaacagagc 240  
 ctctagaaa aattttccac tgaactttac cagcaactga atgacctgga agcatgtgtg 300  
 atacaggagg ttgggggtgga agagactccc ctgatgaatg tggactccat cctggctgtg 360  
 aggaaatact tccaaagaat cactctttat ctaacagaga agaaatacag cccttgtgcc 420  
 tgggaggttg tcagagcaga aatcatgaga tccctctctg tttcaacaaa cttgcaaaaa 480  
 agattaagga ggaaggattg a 501

<210> 92  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 92  
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 gaggagtttg atggcaacca gttccagaag gctgaagcca tctctgtcct ccatgaggtg 180  
 attcagcaga ccttcaatct ctccagcaca aaggactcat ctggtgcttg ggatgagagg 240  
 ctctagaca aactctatac tgaactttac cagcagctga atgacctgga agcctgtgtg 300  
 atgcaggagg tgtgggtggg agggactccc ctgatgaatg aggactccat cctggctgtg 360  
 agaaaatact tccaaagaat cactctctac ctgacagaga aaaagtacag cccttgtgcc 420  
 tgggaggttg tcagagcaga aatcatgaga tccctctctt catcaagaaa cttgcaagaa 480  
 aggttaagga ggaaggaata a 501

<210> 93  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 93  
 tgtgatctgc ctcagaccca cagcctgcgt aataggaggg ccttgatact cctggcacia 60  
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 gaggagtttg atggccacca gttccagaag actcaagcca tctctgtcct ccatgagatg 180  
 atccagcaga ccttcaatct ctccagcaca gaggactcat ctgctgcttg ggaacagagc 240  
 ctctagaaa aattttccac tgaactttac cagcaactga atgacctgga agcatgtgtg 300  
 atacaggagg ttgggggtgga agagactccc ctgatgaatg aggactccat cctggctgtg 360

0954692 091201

aggaaatact tccaaagaat cactctttat ctaatggaga agaaatacag cccttggtgcc 420  
 tgggaggttg tcagagcaga aatcatgaga tccctctctt ttcaacaaa cttgaaaaaa 480  
 ggattaagga ggaaggattg a 501

<210> 94  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 94  
 tgtgatctgc ctcagactca cagcctgggt aacaggaggg ccttgatact cctggcacia 60  
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 gaggagtttg atgataaaca gttccagaag gctcaagcca tctctgtcct ccatgagatg 180  
 atccagcaga ccttcaacct cttcagcaca aaggactcat ctgctgcttt ggatgagacc 240  
 cttctagatg aattctacat cgaacttgac cagcagctga atgacctgga gtctgtgtg 300  
 atgcaggaag tgggggtgat agagtctccc ctgatgaatg aggacttcat cctggctgtg 360  
 aggaaatact tccaaagaat cactctatat ctgacagaga agaaatacag ccttggtgcc 420  
 tgggaggttg tcagagcaga aatcatgaga tccctctctt tatcaatcaa cttgcaaaaa 480  
 agattgaaga gtaaggaatg a 501

<210> 95  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 95  
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 gaggagtttg atggcaacca gttccagaag gctccagcca tctctgtcct ccatgagctg 180  
 atccagcaga tcttcaacct cttctccaca aaagattcat ctgctgcttg ggatgaggac 240  
 ctctagaca aattctgcac cgaactctac cagcagctga atgacttgga agcctgtgtg 300  
 atgcaggagg agaggggtggg agaaactccc ctgatgtacg cggactccat cctggctgtg 360  
 aagaaatact tccaaagaat cactctctat ctgacagaga agaaatacag cccttggtgcc 420  
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 agattaagga ggaaggaata a 501

<210> 96  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 96  
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 gaggagtttg atggcaacca gttccagaag gctcaagcca tctctgtcct ccatgagatg 180  
 atccagcaga ccttcaatct cttcagcaca aaggactcat ctgctacttg ggaacagagc 240  
 ctctagaaa aattttccac tgaacttaac cagcagctga atgacatgga agcctgcgtg 300  
 atacaggagg ttgggggtgga agagactccc ctgatgaatg tggactctat cctggctgtg 360  
 aagaaatact tccaaagaat cactctttat ctgacagaga agaaatacag cccttggtgc 420  
 tgggaggttg tcagagcaga aatcatgaga tccctctctt tatcaaaaaa ttttcaagaa 480  
 agattaagga ggaaggaatg a 501

<210> 97  
 <211> 501  
 <212> DNA  
 <213> human alpha interferon

<400> 97  
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 gaggagtttg atggcaacca gttccagaag actcaagcca tctctgtcct ccatgagatg 180

09954692-091201

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ctcctagaaa aattttttac tgaactttac cagcaactga ataaccggga agcatgtgtg 300
atacaggagg ttgggaaggga agagactccc ctgatgaatg aggactccat cttggctgtg 360
aggaaatact tccaaagaat cactctttat ctaacagaga agaaatacag cccttgtgcc 420
tgggaggttg tcagagcaga aatcatgaga tctctctctt tttcaacaaa cttgcaaaaa 480
agattaagga ggaaggattg a 501

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<210> 98

<211> 501

<212> DNA

<213> human alpha interferon

<400> 98

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gaggtgtttg atggcaacca gtctcagaag gctcaagcca tctctgcctt ccatgagatg 180
atccagcaga ccttcaatct cttcagcaca aaggattcat ctgctgcttg ggatgagacc 240
ctcctagaca aattctacat tgaacttttc cagcaactga atgacctaga agcctgtgtg 300
acacaggagg ttgggggtgga agagattgcc ctgatgaatg aggactccat cctggctgtg 360
aggaaatact ttcaaagaat cactctttat ctgatggaga agaaatacag cccttgtgcc 420
tgggaggttg tcagagcaga aatcatgaga tctctctctt tttcaacaaa cttgcaaaaa 480
ggattaagaa ggaaggattg a 501

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